Claims

Claim 1. The method of making an optical fiber array comprising:

providing a first mask having a first plurality of longitudinally extending holes,

providing a bonding element having a first like-plurality of longitudinally extending holes,

aligning said first mask and said bonding element so that the first plurality of holes and the first like-plurality of holes are substantially longitudinally aligned, and

first anodic bonding the first mask and the bonding element together, and

securing a plurality of optical fibers in said first plurality of holes.

Claim 2. The method of Claim **1** wherein said bonding element comprises a bonding die.

Claim 3. The method of Claim **2** wherein the first mask, the bonding die and the optical fibers are formed of materials that have substantially the same coefficient of thermal expansion.

Claim 4. The method of Claim **3** further comprising

providing a second mask having a second like-plurality of longitudinally extending holes longitudinally aligned with the first plurality of holes, and

second anodic bonding the second mask and said bonding die together, and wherein

the plurality of fibers extend through the first and second like-plurality of holes prior to and during said securing step.

Claim 5. The method of Claim **4** wherein the second mask is formed of material that has substantially the same coefficient of thermal expansion as the optical fibers.

Claim 6. The method of Claim **4** further comprising providing a spacer having a third like-plurality of longitudinally extending holes substantially longitudinally aligned with the second like-plurality of holes,

third anodic bonding the spacer and the second mask together, and

the plurality of fibers extend through the spacer prior to and during said securing step.

Claim 7. The method of Claim **6** wherein the spacer is formed of material that has substantially the same coefficient of thermal expansion as the optical fibers.

Claim 8. The method of Claim **6** wherein the first mask, bonding die and second mask form at least a partial stack and the at least partial stack is heated during anodic bonding.

Claim 9. The method of Claim **8** wherein first anodic bonding includes providing DC voltage of a first polarity between the front and back of the at least partial stack while the stack is heated.

Claim 10. The method of Claim **9** wherein second anodic bonding includes providing DC voltage of a second polarity between the front and back of the at least partial stack while stack is heated.

Claim 11. The method of Claim **10** wherein the heating of the at least partial stack maintains substantially the same at least partial stack temperature from at least the end of said first anodic bonding to at least the start of said second anodic bonding.

Claim 12. The method of Claim **8** wherein the spacer is included in the at least partial stack,

said third anodic bonding step occurring at least partially during said first anodic bonding step.

Claim 13. The method of Claim **8** wherein the spacer is included in the at least partial stack,

said third anodic bonding step occurring after said second anodic bonding step.

Claim 14. The method of Claim **1** wherein said bonding element comprises a spacer.

Claim 15. The method of Claim **1** further comprising anodic bonding the forward surface of the first mask to a glass lens array having

a number of lens elements and wherein the fibers optically cooperate with the lens elements.

Claim 16. An optical fiber array comprising:

a first mask having a first plurality of longitudinally extending holes,

a bonding element having a first like-plurality of longitudinally extending holes,

said first mask and said bonding element arranged so that the first plurality of holes and the first like-plurality of holes are substantially longitudinally aligned, and

the first mask and the bonding element being bonded together by a layer of sodium ions and oxides of the first mask and bonding element materials, and

a plurality of optical fibers secured in said first plurality of holes.

Claim 17. The array of Claim **16** wherein said bonding element comprises a bonding die.

Claim 18. The array of Claim **17** wherein the first mask, the bonding die and the optical fibers are formed of materials that have substantially the same coefficient of thermal expansion.

Claim 19. The array of Claim **18** further comprising

a second mask having a second like-plurality of longitudinally extending holes longitudinally aligned with the first plurality of holes, and

the second mask and said bonding die being bonded together by a layer of sodium ions and oxides of the second mask and bonding die materials, and wherein

the plurality of fibers extend through said first and said second like-plurality of holes.

Claim 20. The array of Claim **19** wherein the second mask is formed of material that has substantially the same coefficient of the thermal expansion as the optical fibers.

Claim 21. The array of Claim **19** further comprising a spacer having a third like-plurality of longitudinally extending holes substantially longitudinally aligned with the second like-plurality of holes,

the spacer and the second mask being bonded together by a layer of sodium ions and oxides of the second mask and spacer materials, and

the plurality of fibers extending through the spacer third like-plurality of holes.

Claim 22. The array of Claim **16** wherein said bonding element comprises a spacer with a predetermined longitudinal thickness

related to a longitudinal dimension of the front portion of the array housing.

Claim 23. The array of Claim **16** further comprising a glass lens array bonded to the forward surface of said first mask by a layer of sodium ions and oxides of the first mask and glass lens array materials, and wherein

the fibers optically cooperate with said glass lens array.

Claim 24. The inventions disclosed herein.